Title:
Personalized Human Modeling: from Anthropometry and Anatomy to Biomechanics and Physiology

Speaker:
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Abstract:
Personalized or subject-specific human modeling and simulation is becoming more and more popular and is of great importance for a wide range of applications on human factors, biomechanics, and computational medicine. In this talk, we will present a systematic pipeline for personalized human modeling and simulation, ranging from anthropometry, anatomy, biomechanics, to physiology. Starting from anthropometry, we will introduce a database generated feature method for personalized model generation based on body measurements and 3D body scans. Since the skin anthropometry affects the interior anatomy and body composition, the capability to extend the variation from skin to interior is highly desired for many research areas including medical imaging and visualization, pharmacology and medical treatment, among others. Specifically, focus will be given to the research area of musculoskeletal biomechanics, for which the anthropometric and anatomical variations dictate the mass, inertia, muscular geometry, strength, and even physiology (such as fatigue and pain) of the given subjects. During this talk, we will discuss various aspects of personalized human modeling and at the mean time present many examples of using such models for studies in computational biomechanics, injury protection, and medical treatment.

Bio:
Dr. Zhou joined NJIT in 2018 and is currently an Associated Professor of Biomedical Engineering and the director of the BioDynamics lab. He obtained his Ph.D. degree in Mechanical Engineering from the University of Iowa in 2007. Before joining NJIT, he was a principal research scientist and lead the Human Performance and Biodynamics group at the CFD Research Corporation in Huntsville, Alabama. He has been PI or Co-PI for many DoD sponsored projects on human performance, injury protection, and treatment. Currently, his research focuses on computational biomechanics, wearable robots, digital human modeling, and personalized medicine.